Selected issues of physical therapy, surgical treatment, and functional disorders prevention of the lower urinary tract

(Leczenie pęcherza nadreaktywnego, niewydolności skurczowej wypieracza i wysiłkowego nietrzymania moczu)

Ł Tomaszewski [1,A,B,D], A Kowalska [1,A,D], D Krzemiński [1,F,C], Z Kopański [1,2,E], J Rowiński [1,B], F Furmanik [1,E]

Abstract – The authors have discussed the basics of pelvic floor muscles rehabilitation. They have characterised the electrostimulation of pelvic floor muscles using a vaginal diode. They have analysed the actions related to biofeedback. They have emphasised drawbacks and advantages of a strategy of this type. They have paid attention to behavioural aspects. The emphasis is put on a patient's need to form habits and reflexes for her to control urination. When discussing the surgical methods of treating functional disorders to the lower urinary tract, the authors have emphasised the low effectiveness depending on the precision of diagnostics and the proper selection of patients for particular surgical methods. The authors have also highlighted the fact that the prevention of functional disorders to the lower urinary tract is aimed predominantly at the reduction of risk factors, with a particular emphasis on the lifestyle changes to live healthier.

Key words **-** functional disorders of the lower urinary tract, physiotherapeutic methods, surgical methods.

Streszczenie – Autorzy zwrócili uwagę na zmieniającą się terminologię określenie zaburzeń czynności pęcherza moczowego co wynika z trudności właściwego ustalenia etiopatogenezy zaburzeń. Omówili wybrane zagadnienia z fizjologii pęcherza moczowego i cewki moczowej w trakcie napełniania i opróżniania oraz zaburzenia czucia pęcherzowego. Następnie scharakteryzowali epidemiologię występowania, objawy kliniczne i wybrane metody leczenia pęcherza nadreaktywnego. Przedmiotem analizy była także niewydolność skurczowa wypieracza. Omówiono przyczyny tej niewydolności oraz niektóre metody leczenia. Kolejnym omówionym zaburzeniem było wysiłkowe nietrzymanie moczu. Autorzy podkreślili rolę schorzeń „maskujących" wysiłkowe nietrzymanie moczu oraz znaczenie diagnostyki i leczenia.

Słowa kluczowe **-** pęcherz nadreaktywny, niewydolność skurczowa wypieracza, wysiłkowe nietrzymanie moczu, diagnostyka, leczenie.

Author Affiliations:

1. Collegium Masoviense – College of Health Sciences, Żyrardów
2. Faculty of Health Sciences, Collegium Medicum, Jagiellonian University
3. The Bronisław Markiewicz State Higher School of Technology and Economics in Jarosław, Poland

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B. Gathering and listing data
C. The data analysis and interpretation
D. Writing the article
E. Critical review of the article
F. Final approval of the article

Correspondence to:

Prof. Zbigniew Kopański MD PhD, Collegium Masoviense - College of Health Sciences, Żyrardów, G. Narutowicza 35 Str., PL-96-300 Żyrardów, Poland, e-mail: zkopanski@o2.pl

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I. CONSERVATIVE TREATMENT

The prevention of functional disorders to the lower urinary tract is aimed predominantly at the reduction of risk factors, with a particular emphasis on the lifestyle changes to live healthier. Of crucial importance here is the awareness of the fact that only some of the functional factors of lower urinary tract disorders are permanent and unchangeable.

Women who are in the group of increased risk should pay particular attention to the actions aimed at minimising the risk of urinary incontinence in their everyday lives. Primary prophylaxis actions include: the avoidance of urogenital system by applying intimate hygiene, quick and effective treatment of urogenital system infections, the regulation of defecation, the avoidance of withholding micturition, proper diet and combating obesity, and early treatment of menopause by applying hormonal therapy. If the incontinence problems are based in the absence of proper muscle tension, the physiotherapy becomes vital. It can include: kinesitherapy, electrostimulation, and biofeedback. Auxiliary methods include pharmacological treatment, surgical treatment, and the behavioural approach. All the elements can co-exist and be complementary to one another [1-8].

Physiotherapeutic methods

The scientific foundations of pelvic floor muscle rehabilitation have been developed by Arnold Kegel – an American gynaecologist, who published the results of his 15 years of studies in treating urinary incontinence by exercising pelvic floor muscles in 1948. Kegel pointed out the fact that the optimal method to strengthen anatomically or functionally damaged muscles is to make them active, thanks to which their weight loss is 4 times less than it would have been when idle. As a result of the regular exercise of the fragments of damaged muscles which can contract, their coordination is improved. This leads to more pressure on urethra when the abdominal pressure increases during effort [2,3].

The correctly done exercises of the pelvic floor muscles, e.g. during a sensorimotor training, cause the return of the so-called proprioception in the levator ani muscles. In the initial period, usually the recommendation is to do three series of exercises a day, each series consisting of 8-12 short (1.5 seconds) contractions of the pubococcygeus muscles. After the satisfied results of the exercises are reached, the continuation of them 2-3 times a week is recommended. The contractions stop the involuntary urination in overactive bladder patients thanks to being able to withhold micturition consciously.

Physical therapy more often than not consists in the preparation of anatomical structures for exercising movement or in the perpetuation of set patterns. A basic treatment is the pelvic floor muscles electrostimulation using a vaginal diode. It is recommended to patients whose muscle reactions are delayed and the contraction can barely be sensed. Significantly hindered nervous and muscle reactions suggest a slight denervation of the muscles, which makes effective exercises impossible. The muscle does not get stronger if subjected to only weak contractions. Stimulation improves the blood supply and the proper electric stimulus enforces the contraction strength necessary for the muscle to rebuild. The rehabilitation period may last two to several months – depending on how weak the muscles are, how conscientiously the patient does the exercises, and on other factors such as obesity. It is worth noting that when stimulating muscles, it is possible to activate the selected muscle or muscle group without burdening the skeletal, respiratory, or cardiovascular systems. Electrostimulation can be applied even to patients with serious systemic strains (that is, after ruling out contraindications, such as metroptosis or urinary system infections). Electrostimulation can be applied during a doctor's appointment and also self-applied at home, but the patient needs to be trained by the physical therapist to perform the latter [6,9,10].

Another exercise method is biofeedback, which consists in a biological feedback loop. In case of stress incontinence and micturition disorders, it consists in learning how to voluntarily contract and relax the pelvic floor muscles. Biofeedback requires specialised equipment (in this case, EMG of pelvic floor muscles) which would allow one to get visual or auditory information on the changes in real time. While observing how the device reacts to various attempts to obtain the right result, a patient learns how to develop the mechanisms governing a given physiological reaction. Currently, this kind of treatment is applied in stess incontinence, both in women and men. The assessment of the therapy effectiveness in women's stress incontinence is due in 3-6 months. In men with stress incontinence who underwent prostate surgeries, it may be scheduled even 8 months into the treatment. An advantage of biofeedback is that it gives one a chance to activate the right muscle group, control the intensity and duration of the contraction and relaxation, and objective observation of the therapy progress. Thanks to the development in electronics, this method was adjusted to the needs of urology with the creation of new programmes supporting the treatment of detrusor sphincter disorders, bladder outlet obstruction, or detrusor underactivity. Modern devices, apart from recording muscle activity, have electrostimulation features. Currently it is possible to keep a database, monitor the therapy fully, present the procedure graphically, and analyse the therapy statistically. Biofeedback is considered and alternative and more modern treatment method. It can be adjusted as the sole treatment method (biofeedback monotherapy) or combined with other forms of conservative treatment [7].

A modern way of rehabilitation is the merging of electromyography, biofeedback, and electrostimulation of pelvic floor muscles into one procedure. These methods make it possible to assess the therapy [3,5,7,11].

The complex approach to urinary incontinence women patients includes also behavioural methods as another form of conservative treatment. It consists in the patient forming habits and reflexes for her to control urination. This therapy is called bladder training. During it, a patient with intact nervous system learns how to stop the contraction of the bladder detrusor muscle. Bladder training is also useful in cases of unstable detrusor muscle, and in stress and mixed incontinence treatment [6,8,10].

When initiating the pharmacological treatment of stress incontinence, one should verify if hormone replacement therapy is necessary. Despite the contradictory data on the effectiveness of oestrogens, some authors claim it is one of the forms of incontinence treatment [12].

II. SURGICAL TREATMENT

The selection of the treatment method in cases of lower urinary tract functional disorders depends on the intensity of the ailment and the topographic proportion changes to the lesser pelvis organs. Over a hundred surgical treatments have been described. Despite the fact that most of them have only historical value, it says a lot about the difficulties in solving the issues to be met in diagnostics and attempts of effective treatment. The main objective is to restore the right topographic proportions to the lesser pelvis organs. This can be achieved by restoring the proper angle between bladder and urethra, as well as by neutralising vaginal cystocele [3].

Surgeries performed in the treatment of lower urinary tract functional disorders can be divided into three main groups [3,13]:

- urethra surgeries
- perineal muscle surgeries
- surgeries aimed at suspending and supporting the urethra and bladder neck
- Considering the surgical approach, the surgeries can be divided with regard to [13]:
- vaginal approach,
- suprapubic approach,
- both access paths.

The results obtained by various authors differ in the number of successful treatments from 45% to 95%. Most authors indicate a drop in the effectiveness rate if the assessment is scheduled after a longer period [14]. Some patients relapse into urinary incontinence because of urinary urgency. Achieving a satisfying recovery depends mainly on [1,3]:

- precise diagnostics,
- the application of careful patient selection for a proper method of pharmacological and surgical treatment.

In order to decrease the number of women with urinary incontinence, the following should be addressed [1,2,8,15] :

- coordinating deliveries correctly – although it is not the delivery itself is a risk factor, multiple organs may get damaged,
- systematic gynaecological checks aimed at, among others, early diagnostics of genitals statics disorders,
- diagnostics and early treatment of urinary tract chronic infections,
- making women limit heavy physical labour as much as possible or abandon it altogether.

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